Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant BL460c Gen10
(3.60 GHz, Intel Xeon Platinum 8156)

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

<table>
<thead>
<tr>
<th>SPECspeed2017_int_base = 8.08</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_int_peak = Not Run</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Platinum 8156
- **Max MHz.:** 3700
- **Nominal:** 3600
- **Enabled:** 8 cores, 2 chips
- **Orderable:** 1, 2 chip(s)
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **L2:** 1 MB I+D on chip per core
- **L3:** 16.5 MB I+D on chip per chip
- **Other:** None
- **Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R)
- **Storage:** 1 x 480 GB SATA SSD, RAID 0
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux Server release 7.4 (Maipo)
- **Compiler:** C/C++: Version 18.0.0.128 of Intel C/C++
- **Compiler for Linux:** Fortran: Version 18.0.0.128 of Intel Fortran
- **Parallel:** Yes
- **Firmware:** HPE BIOS Version I41 11/14/2017 released Nov-2017
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Other:** jemalloc memory allocator library V5.0.1

---

**Threads**

600.perlbench_s 8
602.gcc_s 8
605.mcf_s 8
620.omnetpp_s 8
623.xalancbmk_s 8
625.x264_s 8
631.deepsjeng_s 8
641.leela_s 8
648.exchange2_s 8
657.xz_s 8

---

**SPECspeed2017_int_base (8.08)**

<table>
<thead>
<tr>
<th>Task</th>
<th>Threads</th>
<th>SPECspeed2017_int_base</th>
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<tbody>
<tr>
<td>600.PERL</td>
<td>8</td>
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<tr>
<td>602.GCC</td>
<td>8</td>
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<td>605.MCF</td>
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<td>625.X264</td>
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<td>641.LEELA</td>
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SPEC CPU2017 Integer Speed Result

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SPECSpeed2017_int_base = 8.08
SPECSpeed2017_int_peak = Not Run

Results Table

<table>
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<tr>
<th>Benchmark</th>
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<th>Ratio</th>
<th>Base Seconds</th>
<th>Ratio</th>
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<th>Ratio</th>
<th>Peak Seconds</th>
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</tbody>
</table>

SPECSpeed2017_int_base = 8.08
SPECSpeed2017_int_peak = Not Run

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"
Transparent Huge Pages enabled by default
Filesystem page cache cleared with:
shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run
irqbalance service stopped using "systemctl stop irqbalance.service"
Used throughput-performance profile for tuned-adm: "tuned-adm profile throughput-performance profile"

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.4

No: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
No: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.
No: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.

This benchmark result is intended to provide perspective on past performance using the historical hardware and/or

(Continued on next page)
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Test Sponsor: HPE
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Test Date: Dec-2017
Hardware Availability: Nov-2017
Software Availability: Sep-2017

General Notes (Continued)

software described on this result page.

The system as described on this result page was formerly generally available. At the time of this publication, it may not be shipping, and/or may not be supported, and/or may fail to meet other tests of General Availability described in the SPEC OSG Policy document, http://www.spec.org/osg/policy.htm.

This measured result may not be representative of the result that would be measured were this benchmark run with hardware and software available as of the publication date.

cpuinfo program /home/cpu2017/bin/cpuinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bce91c0f
running on bl460c16 Wed Dec 13 17:08:46 2017

Platform Notes

BIOS Configuration:
Intel Hyper-Threading set to Disabled
Thermal Configuration set to Maximum Cooling
LLC Prefetch set to Enabled
LLC Dead Line Allocation set to Disabled
Memory Patrol Scrubbing set to Disabled
Workload Profile set to General Peak Frequency Compute
Energy/Performance Bias set to Maximum Performance
Workload Profile set to Custom
NUMA Group Size Optimization set to Flat
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bce91c0f
running on bl460c16 Wed Dec 13 17:08:46 2017

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo
  model name : Intel(R) Xeon(R) Platinum 8156 CPU @ 3.60GHz
  2 "physical id"s (chips)
  8 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 4
siblings : 4
physical 0: cores 1 5 9 13
physical 1: cores 1 2 5 11

(Continued on next page)
Platform Notes (Continued)

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 8
On-line CPU(s) list: 0-7
Thread(s) per core: 1
Core(s) per socket: 4
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8156 CPU @ 3.60GHz
Stepping: 4
CPU MHz: 3600.000
BogoMIPS: 7200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 16896K
NUMA node0 CPU(s): 0-3
NUMA node1 CPU(s): 4-7
Flags: fpu vme de pse msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtsc
lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 fma
cx16 xptr pdcm pclid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch epb cat_13 cdp_13 intel_pti
tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle smep bmi2
erms invpcid rvf vpid fsgsbase tsc_adjust bmi1 hle smep bmi2

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.

From /proc/meminfo
MemTotal: 197752920 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

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**SPECspeed2017_int_base = 8.08**  
**SPECspeed2017_int_peak = Not Run**

### Platform Notes (Continued)

From `/etc/*release* /etc/*version*`

```plaintext
from-release:
  NAME="Red Hat Enterprise Linux Server"
  VERSION="7.4 (Maipo)"
  ID="rhel"
  ID_LIKE="fedora"
  VARIANT="Server"
  VARIANT_ID="server"
  VERSION_ID="7.4"
  PRETTY_NAME="Red Hat Enterprise Linux Server 7.4 (Maipo)"

redhat-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)

system-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)

system-release-cpe: cpe:/o:redhat:enterprise_linux:7.4:ga:server
```

```plaintext
uname -a:
Linux bl460c16 3.10.0-693.el7.x86_64 #1 SMP Thu Jul 6 19:56:57 EDT 2017 x86_64 x86_64 GNU/Linux

run-level 3 Dec 13 17:04

SPEC is set to: /home/cpu2017

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/mapper/rhel-home</td>
<td>xfs</td>
<td>839G</td>
<td>38G</td>
<td>802G</td>
<td>5%</td>
<td>/home</td>
</tr>
</tbody>
</table>
```

Additional information from `dmidecode` follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

```plaintext
BIOS HPE I41 11/14/2017
Memory:
  4x UNKNOWN NOT AVAILABLE
  12x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666
```

(End of data from sysinfo program)

### Compiler Version Notes

```plaintext
==============================================================================
| CC  600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base) 657.xz_s(base) |
==============================================================================
```

```
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

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| SPECspeed2017_int_peak = | Not Run |  

### CPU2017 License:

3

### Test Sponsor:

HPE

### Hardware Availability:

Nov-2017

### Software Availability:

Sep-2017

### Compiler Version Notes (Continued)

CXXC 620.omnetpp_s(base) 623.xalanchmk_s(base) 631.deepsjeng_s(base)  
641.leela_s(base)

icpc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

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Base Compiler Invocation

C benchmarks:  
icc

C++ benchmarks:  
icpc

Fortran benchmarks:  
ifort

### Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64  
602.gcc_s: -DSPEC_LP64  
605.mcf_s: -DSPEC_LP64  
620.omnetpp_s: -DSPEC_LP64  
623.xalanchmk_s: -DSPEC_LP64 -DSPEC_LINUX  
625.x264_s: -DSPEC_LP64  
631.deepsjeng_s: -DSPEC_LP64  
641.leela_s: -DSPEC_LP64  
648.exchange2_s: -DSPEC_LP64  
657.xz_s: -DSPEC_LP64
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**Base Optimization Flags**

C benchmarks:
-\texttt{-Wl,\,-z,muldefs \-xCORE-AVX512 \-ipo \-O3 \-no-prec-div}
-\texttt{-qopt-mem-layout-trans=3 \-qopenmp \-DSPEC\_OPENMP}
-\texttt{-L/usr/local/je5.0.1-64/lib \-ljemalloc}

C++ benchmarks:
-\texttt{-Wl,\,-z,muldefs \-xCORE-AVX512 \-ipo \-O3 \-no-prec-div}
-\texttt{-qopt-mem-layout-trans=3 \-L/usr/local/je5.0.1-64/lib \-ljemalloc}

Fortran benchmarks:
-\texttt{-Wl,\,-z,muldefs \-xCORE-AVX512 \-ipo \-O3 \-no-prec-div}
-\texttt{-qopt-mem-layout-trans=3 \-nostandard-realloc-lhs \-align array32byte}
-\texttt{-L/usr/local/je5.0.1-64/lib \-ljemalloc}

---

**Base Other Flags**

C benchmarks:
-\texttt{-m64 \-std=c11}

C++ benchmarks:
-\texttt{-m64}

Fortran benchmarks:
-\texttt{-m64}

---

The flags files that were used to format this result can be browsed at

http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.html

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.xml

---

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU2017 v1.0.2 on 2017-12-13 17:08:46-0500.
Report generated on 2018-10-31 18:05:19 by CPU2017 PDF formatter v6067.